

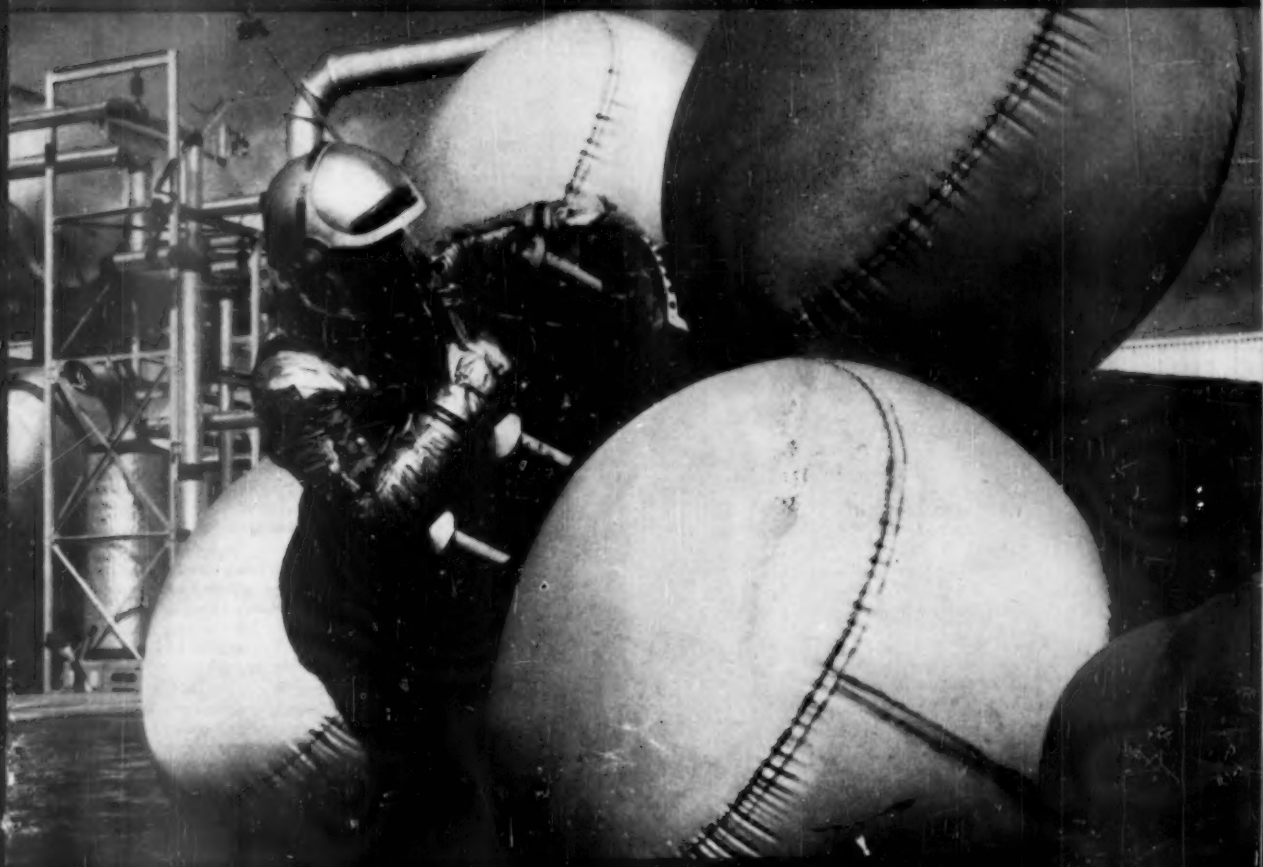
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THE WEEKLY SUMMARY OF CURRENT SCIENCE



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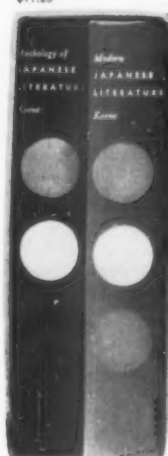
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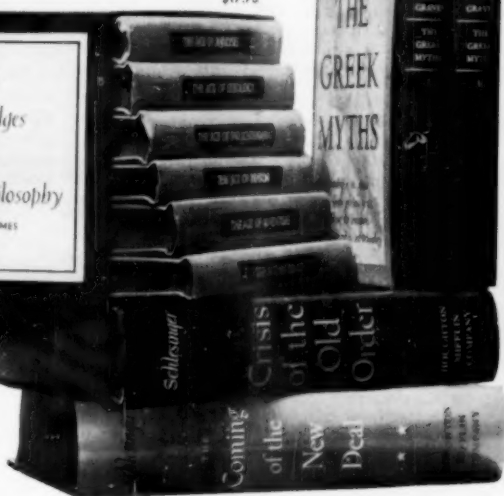
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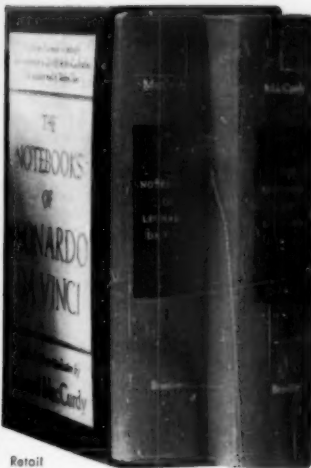
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# SCIENTIA INTERNATIONAL

## NOVAS DEL MENSE IN INTERLINGUA

**Astrophysica.**—Dr. H. D. Babcock del observatorio Mt. Wilson e Palomar in California reporta un reversion del polaritate del campo magnetic del sol. Isto, previamente orientate in direction opposite al campo magnetic del terra, nunc es parallel a illo. Le reversion occurreva in 1957 al polo sud del sol e un anno plus tarde al polo nord. In le interim le duo polos habeva le mesme signo. Le campo magnetic solar es debile in comparison con illo del terra. Le fortias intrasolar que poteva causar un tal reversion non es cognoscite.

**Economia.**—Esseva estimate per Dr. H. S. Brown del Instituto Technologic de California que circa 100 annos de activate e productivitate in omne minas e fabricas del mundo es necessari pro establir pro omne humanos in omne pais del mundo le standards de ben-esser material que existe in nostre dies in le pais del Occidente.

**Selenographia.**—Le Servicio Cartographic del Armea Statounitese, in cooperation con le Servicio Geologic del Statounite, ha in preparation le prime carta topographic del luna. Omne existente cartas es planimetric, i.e., illos reflecte nulle differentias de elevation superficial. Le nove carta va esser basate super photographias contribuite per dozenas de observatorios in omne partes del mundo. Le objective es comparar e coordinar plure photographias del mesme loco lunar, prendite con varie angulos de observation e in varia status de libration lunar. Le libration del luna es su oscillation periodic, gratias al qual circa 10 pro cento plus que le exacte medietate de su superficie appare in nostre campo de vision.

**Astronautica.**—Al Universitate Minnesota e etiam al Universitate Alaska, repetite observationes in le curso del passate annos ha demonstrate que durante periodos de grande activate solar le sol emana un radiation ionisante de 10,000 vices su nivello normal. Durante tal periodos, que dura frequentemente un septimana o plus, un exposition de solamente 30 minutas essera mortal pro un medietate del individuos recipiente lo. Iste constatacion adde enormemente al problemas del astronautica. Le provision de un armatura anti-irradiatori es un solution obvie sed non facile a effectuar.

**Communication. International.**—Le polonese periodico medical "Haematologica Polonica," redigite a Cracovia per le ben-cognoscite hematologo Dr. Julian Aleksandrowicz, ha commenciato publicar summaries in interlingua de omne su articulos original. Le articulos in iste jornal, que es scribite predominantemente in polonese, deveni assi accessibile al numerose medicos in omne partes del mundo qui non sape leger le texto original.

**Recercas de Cancere.**—Dr. G. Dean de Sud-Africa reporta que le mortalitate al cancro pulmonar inter immigrantes britannic qui ha arrivate in ille pais a etates de inter 45 e 64 annos es 44 pro cento plus alte que inter residentes local de etate e racia comparabile. Iste constatacion es sorprendente proque le sud-africanos adulte mascule, con lor consumption medie de cigarretas de circa 24 per capite per die, es cognoscitamente inter le plus forte fumatores del mundo. Le investigationes de Dr. Dean ha constata nulle significative differentias inter le cigarretas fumate in Anglaterra e in Sud-Africa. Le resultados del studio pare incriminar le pollution del atmosfera plus tosto que le habitude del fumar in le causation de cancro pulmonar. Etiam in Sud-Africa iste flagello del humanitate cresce rapidamente in importantia, sed super, toto in le centros urban.

**Hygiene Public.**—In le Statounite le expensas pro assistentia medical se ha sextuplicate deposit 1929. Si on prende in consideration le crescimento del population e le devaluation del moneta, le disbursements medical in 1958 se monstra 100 pro cento plus alte que 30 annos retro. In 1958 le "factura medical" del Statounite esseva 22.7 miliardos dollars.

**Astronomia.**—Astronomos american es plen de admiration pro le grande successo del russos qui ha producite un photographia del altere latere del luna. Tamen, le americanos non es preste a admitte que le absentia relative de crateres e mares in ille photographia es un correcte reflexion del situation real. Si tecnicamente plus perfecte photographias futur provarea de facto que le altere latere del luna es minus accidentate que le latere tornate verso le terra, le effecto essera que nulle del corrente theorias relative al origine del crateres e mares lunar pote esser mantenite. Si on crede que le impacto de meteoros ha create le accidentation del luna o si on crede que il se tracta del effecto de activitate vulcanic, il non es possibile vider proque le duo lateres del luna essera afficte deliberemente.

**Curiositate.**—Quando al base Holloman del Statounitese Fortias Aerice aves se sede super le rails usate in experimentos con rochetts, illos face nulle effortio a salvar se ante le approche del rochetts. Illos non los audi, proque le rochetts viagia a velocitates supersonic. Plus estranie ancora, il non es solamente le aves que suffre in le resultante collisiones. Grande rupturas es non infrequentemente producite in le vehiculos del rochetts. On tenta solver le problema per le creation de un continue cortina de sonos que es desagradabile al aures del aves.

**Energia Atomic.**—Es sub construction in Russia duo fabricas de electricitate que essera activate per energia atomic. Ambes va producer 200,000 kilowatts. Simile fabricas es sub construction in Czechoslovakia e Yugoslavia. Il pare que le russos, in lor effortios in iste campo, incontra le mesme problemas como le americanos. Le plus grande obstaculo in le desenvolvamento del uso de energia atomic in le generation de electricitate es de natura economic. Le methodo non es (o plus tosto: illo es non ancora) capace a competir con le costo del production conventional de electricitate. Le Statounite ha un fabrica que produce 5,000 kilowatts. Un secunde produce 65,000 kilowatts ben que illo es capace a producer 100,000, e (con certe alterationes) mesmo 150,000. In un tertie fabrica, le reactor ha recentemente attingite le stato critic. In 1960 illo va producer 180,000 kilowatts.

**Nomenclatura Scientific.**—Le Committee International pro Pesos e Mesuras ha augmentate le serie del prefixos deca-, hecto-, kilo-, e mega- per giga- e tera- que significa milliardo e billion, respectivamente, e le serie deci-, centi-, milli-, e micro- per nano- e pico- que significa miliardesimo e bilionesimo, respectivamente. Le Statounitese Bureau de Standards a Washington ha commenciato usar le nove prefixos, placiate in lo que es nunc le Mar de Ross.

**Pedagogia.**—In Dighton, Kansas, octanta scholares del septime e octave annos scholar prende un curso in interlingua elementari que es docite como un introduction ideal al studio del linguas estranie. Un simile curso es in progresso in Wellington, etiam in Kansas. Le institutrices responsabile pro iste remarcabile innovation es Srta. Dey in Wellington e Sra. Williams in Dighton.

Science News Letter, November 28, 1959

### GENERAL SCIENCE

## Reading Interlingua

YOU CAN READ Interlingua if you had no more than one semester of high school French or Spanish or Latin and flunked it. You can read and understand a great deal of it even if you had never had contact with any foreign language.

One of ten awards given by the Metropolitan New York Chapter of the American Medical Writers Association for "distinguished service in improving medical communication" was presented Dr. Alexander Gode, chief of the SCIENCE SERVICE Interlingua Division.

Science News Letter, November 28, 1959

## SCIENCE NEWS LETTER

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## RADIO ASTRONOMY

# Hydrogen Gas Expands

**An expanding ring of hydrogen gas moving outward from the Milky Way Galaxy and a whirling central disk of the gas, detected by radio astronomers, have been reported.**

AN EXPANDING ring of hydrogen gas that just appears—where it comes from nobody knows—is one of the latest additions to our Milky Way galaxy, a Dutch astronomer reported at the National Academy of Sciences meeting in Bloomington, Ind.

This ring of gas is moving outward from the dish-shaped galaxy in large quantities, Dr. J. H. Oort of Leiden Observatory told scientists attending a symposium on radio astronomy. In fact, the quantities of gas are so large that at the rate the gas is moving it would be exhausted in 10,000,000 to 15,000,000 years if it were not being constantly replenished.

The source of the hydrogen gas is one of the current puzzles facing radio astronomers. One possible solution suggested by Dr. Oort is the corona of gas that surrounds the Milky Way. However, astronomers then face the problem of where this coronal gas comes from.

Another contribution to knowledge of our galaxy is the discovery reported by Dr. Oort of a flat central disk of hydrogen gas some 3,000 light years in diameter that is rotating in a swirl close to the center of the Milky Way. A light year is the distance light, traveling at 186,000 miles a second, covers in one year. Astronomers use the term to describe the huge distances that separate the various objects in the universe.

Although radio astronomy has extended vastly the range of what can be "seen" in the universe, it is doubtful that many of the "stars," nebulae and galaxies identified as radio sources will be further identified optically by telescopes. This appears to be the consensus at the symposium. About 10% of the radio sources that are reported will probably be checked optically, said Dr. R. Minkowski of Mt. Wilson and Palomar Observatories.

The size of some of the heavenly bodies identified as radio sources poses a problem for optical detection. For example, Dr. Minkowski pointed out that Cygnus A, some 600,000,000 light years away from the earth, appears to be one-fifteenth the diameter of the sun as a radio object. The optical size of Cygnus A, which is two galaxies in collision, is considerably smaller.

Recent radio astronomy studies have also indicated that Venus has a constant temperature of 500 degrees Fahrenheit night and day.

Dr. Joseph A. Giordmaine of Columbus University reported that this temperature, detected by radio measurements below Venus' cloud cover, is the highest among the planets except for Mercury.

So far astronomers cannot account for the source of this heat. Dr. Giordmaine said it is not very probable that a sea of

water is the heat source, as had previously been suggested.

In commenting on the future of radio astronomy, symposium chairman Dr. Merle A. Tuve of the Carnegie Institution of Washington pointed to the need for keeping radio frequency bands free for scientific studies.

Television and "regular" radio interfere with astronomers receiving signals from heavenly sources. International agreements could result in some frequency bands being kept clear for the exclusive use of astronomers attempting to learn more about our universe.

Science News Letter, November 28, 1959

## PSYCHIATRY

## Psychiatry Dips Into International Politics

A PSYCHIATRIST who has just visited Russia dipped his finger into international politics momentarily.

Dr. Nathan S. Kline, research director at Rockland State Hospital, Orangeburg, N. Y., compared psychiatric care and medical facilities in the U.S.S.R. with those in this country to colleagues at the New York Academy of Sciences.

In summary, he said, the manner in which medical services and research are centrally regulated are reflections of the entire approach to societal structuring. The Russian people find a highly centralized government to be very desirable. The only alternative that they can imagine would be utter chaos. Since in the United States this chaos does not exist, obviously, the Russian thinks, there must be a hidden presidium of Wall Street capitalists and other undesirable who do in reality run the country, Dr. Kline explained.

Americans are merely "duped" into believing that they are in a democracy and the "illusion of choice" is a manipulation on the part of those in power to provide a pretense of participation in government.

The various approaches to living one's life are themselves inconceivable to the Soviet citizen. He is taught that one group is predestined to contend with another until only the strongest survives. Therefore, compromise and agreement mean one thing in the U. S. but something quite different in the U.S.S.R.

From the Soviet point of view, for instance, the trade union's major objective should be to wipe out the capitalists; and in turn, the employer should be continuously scheming to abolish the rights of the workers. A compromise or agreement is therefore, from the Soviet viewpoint, a temporary measure until some way of beating the enemy has been found, Dr. Kline said.

The fact that one might compromise because there is some merit or justice to the other person's point of view seems to them nonsensical. Opposing elements are always out to destroy each other and there will be no peace until one of them exhausts itself, he concluded.

Science News Letter, November 28, 1959



**PATIENT WORKERS**—Patients at the Bechterev Hospital, Leningrad, U.S.S.R., are shown manufacturing hair curlers.

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## BIOLOGY

# Study Cell Differentiation

THE NUCLEUS, the so-called "brain" of a cell, with its genes, can no longer be thought of as the sole determiner of what makes a cell behave as it does or what it will do in future generations.

There is a marvelous system of give and take between the genes and the cytoplasm, or non-nuclear material, a geneticist told the National Academy of Sciences meeting in Bloomington, Ind. Research shows more and more evidence that the gene-carrying chromosomes are profoundly influenced by their exact location within the cell.

This give and take can explain how body cells with the same chromosomes can be as different as a skin cell, a nerve cell or a bone cell. It also points to a revolution in genetics that is now in full swing, Dr. T. M. Sonneborn of Indiana University said.

There is no longer any doubt that the same set of chromosomes shows differences in appearance in different kinds of cells. These differences, he said, may indicate differential activity of the chromosomes and genes. There are several examples of these differences. For instance, one particular chromosome in certain tumor cells looks very different from the same chromosome in normal cells. Also, many kinds of cells in female mammals, including human, show a chromosomal structure not found in the same male cells. Furthermore, this structure is found only in certain kinds of cells.

Some genes may be working all the time. Others have their activity limited by cyto-

plasmic substances that are themselves formed by the action of controlling genes.

There is one part of the chromosome that may prove to be of supreme importance for gene action in cell differentiation, Dr. Sonneborn said. This is a part called the "H" part. The "H" part or parts contain very few genes.

Researchers studying corn and fruit flies have found that these parts or regions of the chromosomes have strong controlling influences on nearby genes. A recent report, Dr. Sonneborn told scientists, showed that this "H" part was apparently involved in causing a mutation in a nearby gene in the fruit fly.

Now geneticists have this problem to solve: How does this kind of mutation differ from the normal one?

There is also evidence that cell chemistry influences the gene's activities and that nuclei and chromosomes are chemically different in different cells of the body.

There are three main points to the revolution in genetics of cell differentiation, Dr. Sonneborn concluded.

First, the role of the nucleus, through its chromosomes and genes, will vary from cell to cell. Second, more than "mere exact reproduction" of unchanging sets of genes is going on in the chromosomes. Third, the combined sciences of embryology, genetics, cytology, microbiology, biophysics and biochemistry are now being turned on the problems of cell differentiation.

Science News Letter, November 28, 1959

## BIOLOGY

# Study Irradiated Flies

TESTS with female fruit flies indicate that intense radiation causes more deadly mutations than do chronic or less intense doses over a longer period of time.

Reporting on his studies, Dr. I. I. Oster of the Institute for Cancer Research, Philadelphia, Pa., warned scientists attending the National Academy of Sciences meeting in Bloomington, Ind., against relaxing efforts to keep human exposure down to as low a level as can reasonably be achieved.

"Despite the reduction brought about in our estimates of the amount of genetic damage from any given radiation dose," he said, "it must be emphasized that the total number of detrimental mutations induced in a large human population such as that of the world today, by a chronic dose of the order of those in question in discussions of medical radiation, industrial radiation or fallout, is still, in absolute terms, extremely large."

This means a radiation level should be "at least as low as that already recommended by national and international advisory bodies and, in time, as means of protection continue to develop, to levels even lower."

Two groups of fruit flies were studied, Dr. Oster reported in describing his work

and that of his colleagues, Drs. S. Zimmering and H. J. Muller of Indiana University. One group was irradiated evenly during two weeks at the rate of 11 roentgens an hour; the second received the same dose within 31 seconds at the rate of 460,000 roentgens an hour.

After ten days, offspring were studied that had developed from the mother fly's cells when, at the time of irradiation, they were in the early stage of oögonia or immature germ cells. Compared with seven lethal mutations among 537 flies for the chronic irradiation group, there were 32 lethals among 932 flies receiving intense irradiation.

Earlier research in which mouse oögonia were irradiated, indicated that chronic gamma radiation had a lower mutagenic effect than did acute irradiation. Apparently female fruit flies respond as do mice in this respect, Dr. Oster indicates.

Dr. Oster compared the cell's defenses against radiation damage to a sieve. Some of the dangerous mutation-caused "darts" or radiation products manage to slip through the sieve. Radiation also tends to destroy the sieve as well as the number of point-mutations to the chromosomes.

Science News Letter, November 28, 1959

## CHEMISTRY

# Pre-Living Forms in Space

The first concrete "evidence" that conditions suitable for the development of living forms exist in space is seen in the presence of heterocyclic compounds in some meteorites

MOLECULES FROM SPACE with the earmarks of chemical predecessors of the genetic material that makes life possible on earth have been found. The finding apparently provides the first concrete suggestion that conditions exist in space for development of living forms.

Dr. Melvin Calvin, University of California chemist, said he has found, in stony meteorites, evidence of organic molecules that scientists believe were intermediate in the evolution of chemical forms from inert to living material.

The scientist spoke at a seminar which is a part of Massachusetts Institute of Technology's Compton lectures.

Dr. Calvin's work in part anticipates the day when space vehicles will voyage aloft to bring back samples of planets for analysis in earth laboratories.

"We have found very reasonable evidence of the presence of molecules of the aromatic heterocyclic type resembling the pyrimidines and purines present in terrestrial genetic material," Dr. Calvin said.

The heterocyclic compounds no longer exist as independent molecules on earth. But they are found as fragments of nucleotides, chemicals which in turn are found in chromosomes. And chromosomes are the key genetic materials which carry on life.

According to current scientific theory, Dr. Calvin pointed out, living forms apparently developed on earth through a process of chemical evolution. Atoms like carbon and hydrogen were joined together into progressively more complex molecules by the energy of cosmic rays, ultraviolet light and electrical storms. Heterocyclic compounds were among those formed and eventually these were incorporated into nucleotides and finally chromosomes.

Dr. Calvin said the results suggest the heterocyclic compounds are being formed outside the earth, by pre-biological processes, and that chemical evolution is taking place.

The scientist said that it has been known since the turn of the century that hydrocarbon compounds of the petroleum type exist in stony meteorites. Little effort has been made to use today's advanced analytical techniques to search for more complex organic compounds.

Dr. Calvin said it is reasonable to suppose that the compounds taken from the interiors of meteorites, remain unchanged by the heat generated by entrance into the atmosphere. The heat burns the exterior of a meteorite but by the process of ablation the interior remains cool.

Science News Letter, November 28, 1959



**SOUTH POLE FLAG**—Willis Jacobs of the geophysics division, U. S. Coast and Geodetic Survey, is shown raising the Survey's flag at the South Pole on Dec. 21, 1959. During the 1960 research program a permanent marker will indicate the exact location of the South Pole station at latitude  $89^{\circ} 59' 43.6''$  S and longitude  $24.8^{\circ}$  W.

## ASTRONAUTICS

## Automatic Guidance in Space Now Possible

TRIPS to other planets, and to the much more distant stars themselves, will not be delayed by lack of navigation systems.

The same kind of mechanisms that have been developed for missile and other guidance, when combined with computers, timing devices and automatic servodrives, could make possible now automatic navigation to Mars and between the planets.

Dr. Charles Stark Draper, inventor of inertial guidance and director of the Instrumentation Laboratory of Massachusetts Institute of Technology, believes that the basic problems in guiding space ships through space have been solved. He was awarded the Magellanic gold medal of the American Philosophical Society in Philadelphia.

Men will not need to steer space ships on interplanetary flights the way automobiles are driven manually. Guiding devices will be automatic and operated by human brains and hands only when directions and objectives are changed. The inertial navigation components of gyroscopes, gimbals and servodrives, that can keep direction without external contacts, would be used to complement automatic trackers for the sun, planets and stars.

Science News Letter, November 28, 1959

## PUBLIC HEALTH

# Smog Filters Aid Health

TWO DAYS of smog-free filtered air can bring about "significant improvement" in breathing for persons suffering from asthma, emphysema or other respiratory diseases.

As a result of a three and one-half year long study, a team of California researchers recommends that patients use activated carbon filters both at home and in the office in smog-ridden areas such as Los Angeles.

The composition of smog in Los Angeles differs from that found in other cities, such as St. Louis, Pittsburgh or New York. There is no coal smoke, but the major source of smog is the exhaust from 3,000,000 automobiles.

Some 46 volunteers afflicted with emphysema, a disease in which the lung's air passages and air sacs are enlarged and the walls of the air sacs are wasted away, were among those studied. The severity of the disease is aggravated by the car-exhaust smog found in Los Angeles, report Drs. Hurley L. Motley, Reginald H. Smart and Charles I. Leftwich of the University of Southern California. Normal persons

showed no significant lung volume changes from breathing filtered air as compared with smoggy air, they point out in the *Journal of the American Medical Association* (Nov. 14).

This study indicates that breathing smog has direct effects on the respiratory tract in addition to direct effects on the eyes and indirect statistical effects on total mortality, the scientists say. They also report a delayed response of two or more days before the maximum adverse effects of breathing in smoggy air were felt by most persons.

Emphysema patients experienced a beneficial decrease in the volume of residual air when breathing filtered air as well as an increase in their "vital capacity."

Although the Los Angeles area does maintain a smog alert system, the scientists conclude that "the major health problem at present relates to the effects of the pollutants in the atmosphere at lower concentrations than the alert level (0.5 parts per million of ozone in the air) and for prolonged periods of time."

Science News Letter, November 28, 1959



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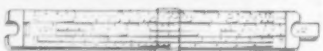
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## OCEANOGRAPHY

# Submerged Island Found

A SUBMERGED ISLAND in the Arctic Ocean has been charted by scientists from Columbia University.

The "island," about 500 miles north of the tip of Siberia, rises approximately 8,100 feet above the ocean bed. Its top, 900 feet below the surface of the ice, is about 14,000 square miles in area and resembles some of the great table lands in western United States.

The formation is in the same area in which the atomic submarine Nautilus reported encountering a "submerged mountain range uncharted and unknown" on its underwater crossing of the North Pole last year.

Four scientists from Columbia's Lamont Geological Observatory reported discovery of the "island" on their return from a summer spent on the drifting ice station Alpha II, established last May at a point 300 miles north of Point Barrow, Alaska. They mapped the ocean floor continuously as the ice on which the station is located drifted.

When the submerged island was reached, "the ocean bottom suddenly leaped from 9,000 to 900 feet in a little more than one day's time, or about four and a half miles of drift."

Underwater photographs show abundant marine life on top of the island, including sponges, a species of cold water shrimp, sea anemones and small fish. Pictures of the surrounding ocean bed showed very little life.

Specimens taken by trawls along the top of the formation included eight-inch starfish; four-inch bristled flat worms; a strange two-inch tadpole-like creature, resembling a teardrop, and with large blue eyes; and a new species of a small mosquito-like creature with a long antenna.

Numerous fossils of clams and snails estimated to have been dead 10,000 years or more were also found. No live specimens were encountered, however.

Science News Letter, November 28, 1959

## ASTRONAUTICS

# Parakeet for Space

A PARAKEET could well become the ideal passenger in future space flight tests.

Wishing they had some animal that could talk, scientists at the School of Aviation Medicine at Brooks Air Force Base, Tex., are preparing for the next animal-in-space flight.

"If only they could talk, we would be able to learn much more about what goes on during space flight," James Dickey, an electronics engineer at the School, said. He, along with other scientists, is presently working on the package or bio-pack, that will carry the next monkey beyond the atmosphere. It is a 130-pound biological package that will fit any type of missile, and is the payload for the next United States animal shot.

The next monkey to follow the now-famous female monkey, Baker, is a cinnamon colored two-year-old Rhesus male. His tail has been bobbed to reduce the amount of weight as much as possible, the scientists, huddled around the animal, explained.

The package itself is built to accommodate a six- to eight-pound Rhesus. Scientists hope to be able to study the effects of space flight on both the body and mind of the animal. If the flight is short, 15 or 20 minutes, the monkey will pull a lever throughout the entire trip. If, however, the trip is longer, the monkey will pull the lever for perhaps five minutes every hour.

Thus, scientists will know if the animal is capable of thinking and performing physical motions during periods of weightlessness and extreme gravity forces. The monkey will lie on its back during the flight. From this position, he will be able to see a red light overhead. When the light blinks, the monkey is conditioned to

pull a lever. Failure to do so results in a slight electronic reminder.

Cameras mounted inside the package will be trained upon the monkey during his entire trip. Special equipment aboard will record any motion sickness the animal might suffer by recording his eye movements which would, in that event, be snapping back and forth.

Science News Letter, November 28, 1959

## TECHNOLOGY

# Catalysts Help Turn Graphite Into Diamonds

THE LABORATORY secret of turning graphite into tiny man-made diamonds is use of metals as chemical "persuaders" or catalysts.

Small amounts of chromium, manganese, iron, cobalt, nickel, ruthenium, rhodium, palladium, osmium, iridium, platinum or tantalum were found to foster fast growth of one-tenth-carat industrial diamonds, but these metals do not enter into the chemical reaction that occurs at high temperatures and pressures.

General Electric research scientists said the process has been covered by a Government secrecy order until recently. Pressures of 800,000 to 1,800,000 pounds per square inch and temperatures of 2,200 to 4,400 degrees Fahrenheit have been used to make diamonds synthetically. At low temperatures, most diamonds produced are cube-shaped. Eight-sided crystals predominate at high temperatures. Also at low temperatures, the diamond color is black, grading through dark green, light green, yellow and white as temperature climbs.

Science News Letter, November 28, 1959



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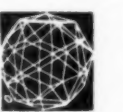
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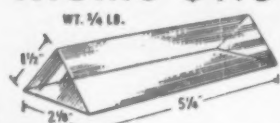
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## ASTRONOMY

# Lava Tubes for Shelter

WHEN MAN lands on the moon, he may find ready-made lava tube houses which will protect him from the alternately sub-freezing and scorching temperatures there.

These lava tubes, or tunnels, are formed under the lava crust that overflows as a volcano erupts. As this crust hardens and cools, there will still be small streams of hot, fluid lava underneath, which later run out and leave empty tubes.

On earth such lava tubes are known to exist in igneous rock formations—a famous one is near the volcano Kilauea in Hawaii. We may expect to find them on the moon also, if the moon's surface features were formed by volcanic activity, Dr. Jack Green, geologist of the Missile Division of North American Aviation Corporation, Downey, Calif., told the National Capital Astronomers in Washington, D. C.

The two most popular theories of the origin of the moon's surface features are the impact theory and the volcanic theory. Neither is yet proved. The impact theory holds that the deep rifts and the craters of the moon were formed by the impact of meteors and other objects hitting the surface. The volcanic theory maintains that the lunar features resulted from the internal processes in the cooling and shrinking of the moon.

On earth, craters from volcanic activity appear much like the ones seen on the moon, except they are much smaller. These craters, called calderas, are formed when the central part of a volcano collapses.

Crater Lake in Oregon is an example of such a caldera.

The process by which the calderas on earth were formed has generally been known, but it has never been applied in trying to explain the origin of the craters of the moon, Dr. Green said. He proposed three mechanisms that favor a lunar volcanism which is much more explosive than that on earth and would account for the much larger craters, some of which are up to about 150 miles across.

1. Because the moon has less gravity than the earth, the bubbles formed in a volcanic column of lava would tend to gather together six times deeper than in a volcano on earth.

2. The bubbles, rising in this longer lava column, when expanding, would absorb heat from the molten rock and make the lava more sluggish in the upper part of the volcano.

3. The absence of oxygen on the moon's surface would eliminate surface heating effects due to oxidation and increase the sluggishness (viscosity) of the lava on the surface.

These three mechanisms increase the possibilities for explosion at the top of the lava column because the sluggish lava forms a cap at the top instead of rising further. There would also be a much greater degree of collapse after the degassing of the molten lava column and therefore bigger craters.

Science News Letter, November 28, 1959

## MEDICINE

# Cancer Control Hinted

A TIME TABLE for a normal cell's turning into a cancerous cell, presented to the National Academy of Sciences meeting at Bloomington, Ind., may hold promise of a new approach to cancer control.

In less than a week after infecting chicken eggs with a virus-caused cancer, Rous sarcoma virus, normal cells will have changed into cancer cells, Dr. James Ashmore of the Indiana University Medical School, Indianapolis, said. The changes from normal to cancerous can be timed by the cell's appetite for glucose.

Infected cells have a voracious appetite for glucose, he explained. In his studies, carried out with Drs. Richard Uhl and Alvin S. Levine also of the Indiana Medical School, Dr. Ashmore has been able to relate changes in a cell's affinity for and utilization of glucose with its state of infection.

As infection continues, there are certain changes in lactic acid production—a result of the cell's "eating" glucose—and glucose utilization is as high as seven times that of uninfected cells, Dr. Ashmore reported.

At this point, the scientist explained, the findings are mainly of interest because of the basic information gained on how cancer

cells function and get their energy supply and how this differs from normal cells. However, there is the possibility that some chemical compound can be found that will substitute for glucose and trick the cancer cell into utilizing it for food. With the cancer cell's greater appetite for glucose, this might mean controlling its growth or even causing death of the cell.

Science News Letter, November 28, 1959

## Do You Know

Unless properly controlled, weeds may completely crowd out crop plants.

Lightning strikes the earth an average of more than 8,000,000 times daily.

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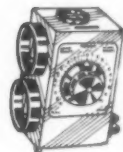
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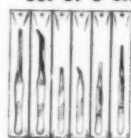
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## OCEANOGRAPHY

**Land "Mapped" Beneath Gulf of California**

FOR THE FIRST time the hills and valleys beneath the mud-and-sand bottom of the Gulf of California have been mapped.

The mapping was completed by Dr. John C. Harrison of the Institute of Geophysics at the University of California, Los Angeles, and Dr. Michael Caputo of Italy's University of Trieste, during a two-month scientific voyage aboard the SS Horizon, the 505-ton research vessel of the Scripps Institution of Oceanography.

Crossing the Gulf between Baja California and the Mexican mainland, the two scientists measured the pull of gravity of the invisible rock formations, with changes in the pull indicating variations in the height and composition of the ridges.

Their tool was a gravity meter, an apparatus so sensitive that it can detect changes in gravity of one in a million.

It will take about a year to evaluate the data, after which scientists will have the first map of the "land" beneath the Gulf.

"This is one of the first large-scale gravity surveys made from a surface ship," says Dr. Harrison. "Until now, most measurements were taken by submarines which could dive under the waves and float in still water."

The survey, supported by the U. S. Office of Naval Research, is part of the "Vermilion Sea Expedition," a wide-ranging study by the University's Scripps Institution.

Besides its importance to oceanographers and the Navy, the study may lead to oil explorations beneath the ocean floor.

Science News Letter, November 28, 1959

## PSYCHOLOGY

**Decision-Making Helps Child Accept Authority**

A BOY TODAY is probably no more rebellious than his father was. Educators agree today's children ages nine through 12 are not drastically different from yesterday's children of these same ages.

A four-year study of school programs across the country, conducted by the U. S. Office of Education, found reassurances among the 1,300 educators who work with some of the nearly 8,000,000 children in grades four through six.

There are differences in society now, however. Some children—"door-key" children—are being deprived of adult companionship at important times such as immediately after school is over to supper time. Children who are accustomed to being with adults and talking things over with their parents and teachers are likely to continue doing this. They are able to live within the regulations that have been agreed upon.

Most children from nine to 12, educators generally agree, want to be useful, to try out their own powers in making and doing things. They want to think for themselves,

but they also want to develop codes of behavior which will meet the approval of adults around them.

Those children who have had no hand in decision-making, but simply have been required to live by pre-set adult rules, are likely to rebel against authority.

Children do need and want to know what is expected of them, the study showed. It is not knowing that upsets them. This is especially true when parents or teachers are indifferent to them, or when demands made upon them by adults are not consistent.

Methods teachers and curriculum-makers use to educate children in grades four through six make up a major part of the report. Both slow and gifted children can be challenged to learn and to improve their skills along many lines, the educators said.

The committee which prepared the study included Drs. Helen K. Mackintosh, chief of the Department of Health, Education and Welfare's elementary schools section, Gertrude M. Lewis, Paul Blackwood, Jane Franseth, and Elsa Schneider.

Science News Letter, November 28, 1959

## PUBLIC HEALTH

**7,000 Students Answer Queries About Smoking**

WHEN, WHERE AND IF junior and senior high school students smoke is the target of a study recently launched.

More than 7,000 students from the seventh through the twelfth years in the Newton, Mass., schools have filled out initial questionnaires prepared by the staff of the department of epidemiology of the Harvard School of Public Health.

The study will seek the answers to such questions as when are smoking habits formed; what are the influences that lead to the establishment of such habits; do young people smoke because their parents smoke?

The entire survey will extend over a three-year period. It will include follow-up interviews with a selected group of parents and students, Dr. Eva J. Salber, research associate in epidemiology and director of the study, reported.

The questions asked each student separates them into three groups: those who have never smoked, those who have smoked and stopped, and those who now smoke.

Beyond the statistical evidence seeking out the length of time smokers have smoked and the extent of their smoking, the Harvard survey also seeks to relate the habit, or lack of habit, to book reading (apart from class assignments), television viewing (the average number of hours during the week and over the weekend), driving habits and extracurricular activities such as dances, clubs and athletics.

Although no direct attempt is made to link cigarette smoking with the onset or prevalence of lung cancer, two of the questions deal with this topic: Have you ever heard that lung cancer may be caused by smoking? Do you believe that smoking causes lung cancer?

Science News Letter, November 28, 1959

**IN SCIENCE**

## RADIO ASTRONOMY

**Radio Sources Studied for Space Communications**

HOW AND WHEN the radio signals sent out by heavenly objects called radio "stars" change, or "twinkle," is giving information that may aid in solving problems of communication between the earth and space vehicles.

Dr. H. C. Ko, assistant director of the Ohio State University Radio Observatory, measured the scintillation effects of the earth's atmosphere on radio waves from the source known as Cygnus A at a wavelength of about 13 inches. The changes in radio signals result from moving irregularities in the ionosphere, hundreds of miles above the earth's surface.

Cygnus A, a very strong radio wave source, actually consists of two galaxies, each containing billions of stars, colliding at a distance of 200,000,000 light years. A light year is the distance light, traveling at 186,000 miles a second, covers in one year.

Dr. Ko found the scintillation effects previously observed at longer wavelengths were also present at the 13-inch wavelength. The "twinkling" was usually most pronounced when the source was rising or setting. However, during auroral disturbances, strong scintillation effects were also noted when the star was high in the sky.

Statistical studies of the scintillation showed a variety of seasonal effects and, at certain times, a close relation to disturbances in the earth's magnetic field.

Dr. Ko's observations were made with the 40-foot steerable dish-shaped radio telescope in a Research Foundation project conducted for the U. S. Air Force Cambridge Research Center.

Science News Letter, November 28, 1959

## ASTRONAUTICS

**U. S. Orbits Glass Rocket That Holds Space Promise**

THE UNITED STATES has fired a 50-pound glass rocket into orbit, and indications are that more of them are to come.

The third stage of Vanguard III, which put a 50-pound payload into orbit on Sept. 18, was made of glass fibers bound with a plastic substance. The 50-pound glass rocket motor burned ten seconds longer than other third stages used on earlier Vanguards and went into orbit with the payload, the National Aeronautics and Space Administration said.

A similar glass-fiber rocket motor is now scheduled for use on NASA's Thor-Delta vehicle which is scheduled to put a 100-foot balloon into orbit around March. The glass-fiber rocket will form the Thor-Delta's third stage.

Science News Letter, November 28, 1959



# THE FIELDS

## PSYCHOLOGY

### Personality Tests Find Future Suicides

PERSONALITY TESTS can be used to predict which mental patients will later attempt or succeed in killing themselves.

How to predict suicide was described to the American Psychological Association meeting in Cincinnati by two research teams from Veterans Administration hospitals in Los Angeles, Calif., Durham N. C., and Brockton, Mass.

Significant answers to the standard "MMPI" personality test were found to characterize persons who later showed various kinds of suicidal behavior, Drs. Norman L. Farberow and Edwin S. Shneidman of VA Center, Los Angeles, reported.

The well known Rorschach ink blot test can be used to spot the person who may wind up a suicide, Drs. Paul G. Daston of VA Hospital, Durham, N. C., and George A. Sakheim of VA Hospital, Brockton, Mass., reported. One way of scoring the test classified correctly 83% of non-suicidal mental patients, 72% of those who later tried to kill themselves and 82% of those who were actually successful suicides.

Science News Letter, November 28, 1959

## METEOROLOGY

### Weather Bureau Gives Information for Olympics

WEATHER and climate information for the Squaw Valley, Lake Tahoe, Calif., area where the 1960 Winter Olympics will be held next Feb. 18-28 has been compiled by the U. S. Weather Bureau.

Squaw Valley lies just east of the ridge of the Sierra-Nevada. It is about two and a half miles long and a quarter mile wide. Mountains rise abruptly from the valley floor, which is about 6,200 feet above sea level, to ridges of 7,000 to 8,000 feet in all directions.

The prevailing winds and the highest winds are probably from the southwest. Temperatures show the wide variations typical of a high mountain valley, with the range between the mean temperature of the warmest month, July, and the coldest month, January, averaging 35 degrees. Highest temperature recorded at Squaw Valley is 90 and the lowest is 15 degrees below zero Fahrenheit.

Freezing temperatures, the Weather Bureau reports, can occur in every month of the year, thus restricting local gardening to the most hardy vegetables and flowers. Because of the protective winter snow covering, the ground usually does not freeze below the immediate surface.

Most of the precipitation falls as snow in the winter months. More than three-fourths of the annual average precipitation

occurs in the five months from November through March.

The heaviest observed precipitation during one day was 5.10 inches on Dec. 23, 1955. Hourly precipitation intensities of four-tenths of an inch or more and 24-hour amounts of four inches or more recur about every two years. Wintertime thunderstorms are rare, although summertime ones are not.

The first snow generally falls in the valley in the last half of October and by the first of December the floor of the valley is usually covered with snow. The snow cover increases to a median depth of two feet on Jan. 1, four feet on Feb. 1, and a winter seasonal peak of five feet the first half of March. It then decreases rapidly to disappear on the valley floor on the average by May 1.

At higher elevations, snow continues much later, starts earlier in the fall and accumulates to greater depths.

The greatest monthly snowfall recorded was 72 inches in March, 1958. The greatest daily fall was 49 inches on April 3, 1958, and the greatest depth on the ground was 130 inches, also on April 3, 1958.

Science News Letter, November 28, 1959

## PUBLIC HEALTH

### Protection Planned Against Atomic Wastes

WAYS of protecting the earth from contamination by the radioactive waste created by the atomic energy industry will probably become the responsibility of the International Atomic Energy Agency which, with cooperation of UNESCO and FAO, assembled some 200 scientists in Monaco to discuss the disposal of such wastes.

The agency also set up a panel to formulate recommendations for an international agreement on disposal of radioactive wastes into the sea. Such an agreement would guarantee that no excessive amounts of radioactive waste products could be released into the oceans and build up to become a hazard to man.

Dr. W. G. Kaufman of the University of California reported that the deep underlying formations of the earth might be the right storehouse for radioactive wastes. Dr. Kaufman believes that storing the waste products in sandstone formations might under certain circumstances be more economical than to provide sufficient chemical treatment in order to allow the discharge of the effluent to surplus streams or estuaries. A two-well prototype injection system has been in operation at the Engineering Field Station of the University of California for two years.

Synthetic wastes containing trace concentrations of strontium 89 and cesium 134 were continuously introduced into the ground for periods up to six weeks. For a disposal system, Dr. Kaufman conceived a pattern of injection wells for introducing the waste into the deep formations of the earth and relief wells which are to serve to reduce well-head pressures and at the same time direct the flow so that maximum use of the formation can be made.

Science News Letter, November 28, 1959

## MEDICINE

### Trachoma Virus Isolated By U. S. Research Team

A VIRUS from the eye of a man with trachoma, a serious eye disease, has been isolated for the first time in the United States.

Light sensitivity, pain and tearing characterize this disease, in which the delicate membrane that lines the eyelids and covers the eyeball in front—the conjunctiva—becomes inflamed.

Now, many intriguing questions concerning this eye disease which afflicts close to half a billion persons are under study, a team of San Francisco researchers reports in *Science* (Nov. 13). Found mainly in Africa, Asia and parts of Europe, the disease is no longer widespread in the U. S. where it occurs mostly in the West and Southwest.

Some of the research that can now be undertaken includes production of the virus toxin and studies of its "pathogenic potential." Scientists are also interested in comparing this virus with those isolated from trachoma-infected eyes in China, Gambia (Africa) and Arabia.

The virus belongs to the elementary-body virus of the psittacosis-lymphogranuloma group, report Drs. L. Hanna, P. Thygeson and E. Jawetz of the University of California Medical School, and Dr. C. Dawson of the U. S. Public Health Service's Communicable Disease Center.

Scrapings were obtained from a trachoma patient's conjunctiva and injected into young embryo eggs. The virus strain found was similar in size and other properties to those grown in foreign research. Some monkeys inoculated with an egg yolk mixture of the virus had symptoms of the disease.

Science News Letter, November 28, 1959

## ASTRONOMY

### Heavenly Object Called "Remarkable" Galaxy

MESSIER 82, which consists of millions of stars clustered together in an irregular form, is a "remarkable" galaxy, two astronomers reported.

Drs. W. W. Morgan of the University of Chicago's Yerkes Observatory and N. U. Mayall of the University of California's Lick Observatory studied the light from the exceptional cluster on photographs taken with the 82-inch McDonald Observatory telescope. They found the light from this irregular galaxy is very much redder than that from other galaxies of the same class because Messier 82 is embedded in a very large dust cloud.

M-82 is a faint object located in the constellation of Ursa Major, the large bear, between the pointer stars in the Big Dipper and the Pole Star.

The presence of heavy dust in and around this galaxy sets M-82 off from most other irregular galaxies, they reported to the National Academy of Sciences meeting in Bloomington, Ind.

Science News Letter, November 28, 1959

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ASTRONOMY

# Orion Visible

Finest display of bright first magnitude stars is seen  
in the sky. Also observable is the interesting double "eclipsing  
variable" star, Algol, in the constellation of Perseus.

By JAMES STOKLEY

NO NAKED-EYE planets appear in the  
evening skies during December this year,  
but their loss is not very noticeable. The  
display of stars at this season is the finest  
that we can ever see.

The stars are shown on the accompany-  
ing maps, which are drawn to depict the  
skies as they look about ten p.m. (your  
own kind of standard time) at the first of  
December, an hour earlier at the middle  
and two hours earlier at the end.

Orion, which stands in the southeast, is  
the most conspicuous group and you can  
easily recognize it by the three stars in a  
row that form the belt of this warrior, as  
the old star maps represented him. Modern  
astronomers pay no attention to these an-  
cient fancies.

Above and to the left of the belt you see  
the first-magnitude star Betelgeuse (in one  
of Orion's shoulders). Another, called Rigel,  
is below and to the right. This is in one  
of his legs. Rigel, incidentally, is an ex-  
tremely bright star, as measured by its  
actual luminosity, for it is about 60,000  
times brighter than our sun. If the sun  
were at Rigel's distance (900 light years)  
we would need a telescope to see it.

Below Orion is Canis Major, the great  
dog, with the star called Sirius. This ap-

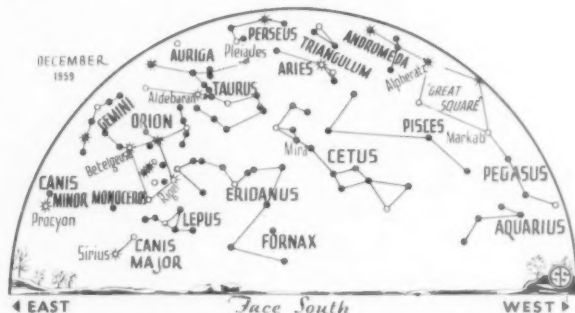
pears to be the brightest star in the night-  
time sky, although its low altitude at pres-  
ent dims it a little. Sirius, however, is only  
about 20 times as bright as the sun; it ap-  
pears so bright because it is relatively close,  
at a distance of 8.7 light years. A light  
year is the distance light travels in a year,  
at a speed of 186,000 miles per second, or  
about six trillion miles.

Above Orion stands Taurus, the bull. Its  
brightest star—distinctly red in color—is  
called Aldebaran. To the left of Taurus,  
in the northern half of the sky, you will see  
Auriga, the charioteer, with another first-  
magnitude star, Capella. Below this group  
are Gemini, the twins, with Castor and  
Pollux. The latter is the brighter of these  
two stars. Still lower is the lesser dog,  
Canis Minor, with Procyon.

Thus, around Betelgeuse as a center,  
there are six bright stars: Sirius, Procyon,  
Pollux, Capella, Aldebaran and Rigel. These  
are all of the first magnitude, or brighter.  
No other part of the sky contains as many  
in the same area.

Two others are visible toward the north-  
west. Close to the horizon—and therefore  
considerably dimmed—is Vega, of Lyra, the  
lyre. And a little higher is Cygnus, the  
swan, with Deneb, also fainter now than  
when it is overhead.

(Continued on p. 369)



• • • SYMBOLS FOR STARS IN ORDER OF BRIGHTNESS

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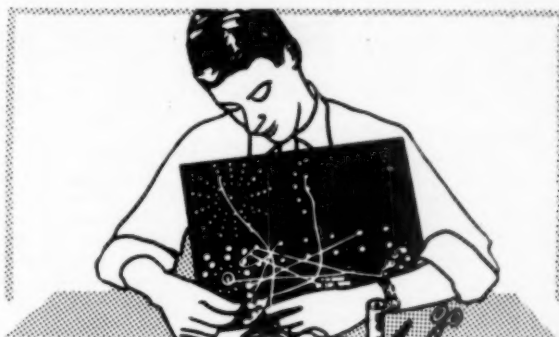
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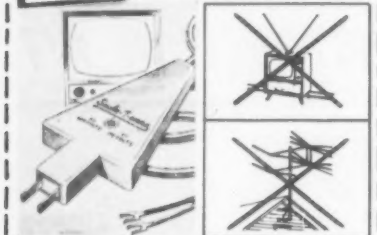
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GEOLOGY

## Old Faithful Has Rival

A GEYSER that rivals Yellowstone's Old Faithful is spouting hot water 150 to 200 feet into the air and promises to be a new tourist attraction.

Located 35 miles east of Lakeview, Ore., the geyser resulted from a search for natural steam for power purposes.

After drilling 1,682 feet and not finding sufficient water on the Charles Crump ranch, the Nevada Thermal Power Company abandoned the project on June 29.

Two days later, a geyser of hot water spouted up through the casing, and present indications lead to the belief that Oregon has a rival to Yellowstone's Old Faithful. While the famous geyser in Wyoming erupts to a height of 120 feet, the southern Oregon spectacular waterspout reaches a height of 150 to 200 feet. Not only that, but the flow is continuous. It erupts at a rate of 67 feet per second, with a flow of 400 to 600 gallons a minute, at a temperature of 200 degrees Fahrenheit at the casing.

Tourists, local residents and the ranch owner himself, who is using the runoff for

irrigating before it drains into Crump Lake through canals, vigorously protested the original decision of the State Engineering Department and the attorney general to cap the spectacular spouter because it was "wasting water" and because no permit had been issued for drilling. Popular opinion won and the attraction is destined to be one of America's tourist meccas, including, as it does, another hot spring 100 yards east and a true geyser about 100 feet to the north.

Water analysis by the state sanitary authority shows 956 solid parts per million parts of water. There is a half part of arsenic per million parts of water.

Thought to be the only perpetual geyser in the world, the state's geologists doubt that it will continue in that category. State engineer Lewis R. Stanley, knowing that the geyser runs through 100 feet of loose, alluvial material at the surface, early in September warned that it might soon cave in and become just a bubbling hot spring.

But Lakeview's geyser is spouting unabated, regardless of adverse forecasts.

Science News Letter, November 28, 1959

PUBLIC HEALTH

## Japan's Birth Rate Drops

THE MOST RAPID drop in birth rate ever recorded occurred in Japan during the ten years from 1947 to 1956.

The birth rate fell from 34.3 (per 1,000 population) in 1947 to 18.5 in 1956. It fell further to 17.2 in 1957 but rose again to 18 in 1958.

Japan has a population of about 92,000,000 contained within an area about the size of the state of Montana. Her population density is more than 640 persons per square mile, compared with 58 per square mile in this country. Japan, therefore, faces the dangers involved in overpopulation.

The number of births in Japan seems to have diminished more than might be expected solely from the postponement of marriage and the usual effects of industrialization and city life.

Perhaps more significant were the increased use of modern contraceptive techniques, and early legal abortion and sterilization.

Before 1948, Japanese law forbade abortion except in cases of medical emergency. In 1948, however, the Eugenic Protection Act was passed, aimed at the protection of women whose health would be endangered by childbirth, and at prevention of inferior progeny that might be expected if children were born to unhealthy mothers.

This law, which also permitted extension of birth-control facilities and sterilization for health reasons, was amended in 1949 to allow physicians to make economic factors a consideration in deciding whether a woman's health might be endangered by further childbearing. The 1948 law and its later modifications, however, were centered

on health rather than on population control.

The number of induced abortions in Japan was reported as 246,000 in 1949 and as 1,170,000 in 1955. Sterilization of 42,000 women was reported for 1955. Another indication of the drift of public opinion toward family limitation was a 1955 survey in which nearly two-thirds of those interviewed were in favor of such control.

These statistics were reported in a bulletin issued by the Population Reference Bureau.

Science News Letter, November 28, 1959

ASTRONOMY

## "Lost" Meteor Stream Rediscovered in Photos

A "LOST" meteor stream, which gave the spectacular Andromedid heavenly displays of "shooting stars" in 1872 and 1885, has been rediscovered by astronomical detective work using photographic plates.

Three astronomers from Harvard College Observatory and Boston University found 23 meteors during a five-year period that follow the orbit of the comet causing the Andromedid shower. These are the remnants of the swarm, they report in the *Astronomical Journal* (June).

When observed in 1875, the meteor stream was 400,000 miles thick, Drs. Gerald S. Hawkins, Richard B. Southworth and Francis Stenon have calculated. Since then, the swarm has been spread about considerably, resulting in a decline from about 15,000 meteors visible hourly in 1885 to about one every five hours at the present time.

Science News Letter, November 28, 1959



## Orion Visible

(Continued from p. 366)

Although there is no naked-eye planet in the December evening skies, Uranus rises a little later than the time for which these maps are drawn. It is in Leo, the lion, but is too faint to be seen without a telescope.

About three hours ahead of sunrise Venus appears in the east, in the constellation of Libra, the scales. Its magnitude is minus 3.8, which is about seven times as bright as Sirius, so it is easily located. Mercury is farthest west of the sun on Dec. 12. For a few days around this date it will be visible low in the southeast just before sunrise.

On Tuesday, Dec. 22, at 9:35 a.m., E.S.T., winter begins in the Northern Hemisphere. Then the sun is farthest south and directly over a point on the Tropic of Capricorn. The sun will be at its highest for people in southerly countries, so for them it is the beginning of summer.

For those of us who live in the north temperate zone, Dec. 22 is the shortest day of the year—meaning by "day," of course, the time from sunrise to sunset. But the word also refers to the period of time from one noon to the next, and it is noon when the sun is on the meridian, or directly south.

But if, with an accurate stop-watch, you were to time the sun from noon to noon, you would not find it to be exactly 24 hours—unless you performed the experiment about the middle of February or May, the end of August, or the beginning of November. At the end of March the day is about 17 seconds short of 24 hours. In mid-June it is about 13 seconds longer. By early September it is about 22 seconds short; then it starts lengthening to its maximum of the year, at about Christmas Day. The day is now nearly half a minute longer than the nominal time of 24 hours. Thus, when Northern Hemisphere daylight is at its shortest, the day itself is longest.

The reason for this effect is that the sun's apparent motion around the sky from west to east during the year is not uniform. If you could see the stars behind the sun on Dec. 22, you would find that the sun was in the direction of Sagittarius, the archer, a group visible in the south on summer evenings. But the next day you would find that it had moved to the east about twice its own diameter as measured from the starry background. The distance it moves is greater now than at any other time of year.

This means that the sun is delayed in getting back to the meridian, because its easterly motion across the sky partly offsets the daily westward movement from sunrise to sunset. The delay is greatest, now that the eastward movement is at a maximum. In March, when it is at a minimum, the delay is least, and the length of day is about 45 seconds shorter than it is at Christmas time.

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(Continued on p. 374)

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PLANT PATHOLOGY: An Advanced Treatise, Vol. I: The Diseased Plant—J. G. Horsfall and A. E. Dimond, Eds.—*Academic*, 674 p., \$22. For the research worker.

PLANT PHYSIOLOGY, A Treatise, Vol. II: Plants in Relation to Water and Solutes—F. C. Steward, Ed.—*Academic*, 758 p., illus., \$22. For advanced and postgraduate students.

PREDICTION AND OUTCOME: A Study in Child Development—Sibylle Escalona and Grace Moore Heider—*Basic Bks.*, 318 p., \$6.50. Observations of personality development from infant to preschool age.

PREHISTORIC ZOO—Carroll Lane Fenton and Mildred Adams Fenton—*Doubleday*, 128 p., illus., \$2.50. Pictures fossil animals to awaken young interest.

PREMARITAL DATING BEHAVIOR—Winston Ehrmann, introd. by Margaret Mead—*Holt*, 316 p., \$6. Findings of a study of premarital sexual activities in dating as reported by 1,000 male and female college students.

PRINCIPLES OF DAIRY CHEMISTRY—Robert Jenness and Stuart Patton—*Wiley*, 446 p., \$8.75. Textbook.

PROCEEDINGS OF THE 1959 NORTHWEST CONFERENCE ON ROAD BUILDING—*Ore. State Eng. Expt. Station*, 157 p., paper, \$1. Discussion of problems and experiences.

PROPERTIES OF MATTER—F. C. Champion and N. Davy—*Philosophical Lib.*, 3rd ed., 334 p., \$10. British text.

READINGS IN THE LITERATURE OF SCIENCE—William C. Dampier and Margaret Dampier, Eds.—*Harper*, 275 p., paper, \$1.50. Reprint.

REALM OF NUMBERS—Isaac Asimov—*Houghton*, 200 p., illus., \$2.75. Presents the why and wherefore of number concepts.

R-F AMPLIFIERS—Alexander Schure, Ed.—*Rider*, 96 p., paper, \$2.40. Discusses principles and properties of radio frequency amplifiers.

THE ST. LAWRENCE SEAWAY—T. L. Hills—*(Continued on p. 372)*

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# Books of the Week

(Continued from p. 371)

Praeger, 157 p., illus., \$3.50. Describes the geographical and technical problems involved.

SATELLITES AND SPACE PROBES—Erik Bergaust, foreword by John P. Hagen—Putnam, 48 p., photographs, \$2.50. The history of Explorer, Vanguard, Sputnik and other programs.

SCHIFFERES' FAMILY MEDICAL ENCYCLOPEDIA—Justus J. Schifferes—PermaBooks, 619 p., illus. by L. Bush, paper, 50¢. Reprint of Health Education Council Book.

THE SCHOOL AS AGENT FOR CULTURAL RENAISSANCE—Lawrence K. Frank—Harvard Univ. Press, 55 p., \$1.50. 1958 Burton Lecture.

SCIENCE AND TECHNOLOGY IN CONTEMPORARY WAR—Maj. Gen. G. I. Pokrovsky, transl. from Russian & annotated by Raymond L. Garthoff—Praeger, 180 p., \$4.50. Soviet military thinking on science and modern warfare.

SHORTWAVE PROPAGATION—Stanley Leinwall—Rider, 154 p., illus., paper, \$3.90. Includes Rider Global Time Conversion Simplifier.

SHOW ME THE WORLD OF SPACE TRAVEL—Julian May—Pennington, 62 p., illus. by R. Loew, \$1.95. For boys and girls.

SIXTH INTERNATIONAL CONGRESS AND EXHIBITION OF ELECTRONICS AND ATOMIC ENERGY, Rome, Italy, June 1959; U.S. Papers—AEC (Off. of Tech. Serv.), 81 p., illus., paper, \$2.25. Discusses hazards of radioactive wastes.

SONS OF THE SHAKING EARTH—Eric R. Wolf—Univ. of Chicago Press, 403 p., illus., \$5. History of the cultures of the people of Mexico and Guatemala.

SOVIET EDUCATION TODAY—Deana Levin—De Graff, 170 p., \$3. Survey of Russian teaching methods, with complete syllabuses.

SPECTRA OF LOW-FREQUENCY OCEAN WAVES—W. H. Munk, F. E. Snodgrass and M. J. Tucker—Univ. of Calif. Press, 78 p., paper, \$1.50. Research using computer analyses.

SPEECH AND BRAIN-MECHANISMS—Wilder Penfield and Lamar Roberts—Princeton Univ. Press, 286 p., illus., \$6. Neurologists' study of the cerebral mechanisms of speech, and the learning and teaching of language.

STARS IN THE MAKING—Cecilia Payne-Gaposchkin—Pocket Bks., 162 p., illus., paper, 50¢. Authoritative account of evolution throughout the universe. Reprint.

THE STORY OF MAPS—Terry Maloney—Sterling, 48 p., illus. by author, \$2.50. History of map making for young readers.

THE STORY OF SPIDERS—Dorothy E. Shuttlesworth—Garden City Bks., 57 p., illus. by Su Zan N. Swain, \$2.95. For young naturalists.

STUDIES OF THE HYDROGENATION OF ETHYLENE OVER COPPER-NICKEL ALLOYS—W. Keith Hall and P. H. Emmett—Mellon Institute, 9 p., paper, free upon request direct to publisher, 4400 5th Ave., Pittsburgh 13, Pa.

SUGARCANE AND ITS DISEASES—Claude W. Edgerton—La. State Univ. Press, rev. ed., 401 p., illus., bibl., \$7.50. Reference book.

SUN AND SHADOW AT ASWAN: A Commentary on dams and reservoirs on the Nile at Aswan, yesterday, today, and perhaps tomorrow—Herbert Addison—Chapman & Hall, 166 p., illus., \$2.70. Mainly about Assuan Dam.

TEACHING COMPREHENSIVE MEDICAL CARE: A Psychological Study of a Change in Medical Education—Kenneth R. Hammond and Fred Kern, Jr.—Harvard Univ. Press, 642 p., \$10. About the General Medical Clinic.

TRIP CHARACTERISTICS AND TRAFFIC ASSIGN-

MENT—Jacob Silver and others—Highway Res. Bd., Bull. 224, 135 p., paper, \$2.60.

THE VEGETATION OF WISCONSIN: An Ordination of Plant Communities—John T. Curtis—Univ. of Wis. Press, 657 p., illus., \$7.50. Definitive survey.

VISION IN MILITARY AVIATION—Joseph W. Wulfeck, Alexander Weisz and Margaret W. Raben—USAF (OTS), 378 p., illus., paper, \$5. Describes capabilities and limitations of vision.

VISUALIZED GENERAL SCIENCE—William Lemkin—Oxford Bk. Co., rev. ed., 410 p., illus., paper \$1.15. Ninth-year course.

THE WEAPON ON THE WALL: Rethinking Psychological Warfare—Murray Dyer—Johns Hopkins Press, 269 p., \$6. On mastering "political communication."

YOUR CHILD IN A SCIENTIFIC WORLD—Albertina A. Weinlander—Doubleday, 192 p., \$2.95. For parents, how to encourage a child's curiosity at various ages, community resources, bibliography, list of science clubs and materials.

Science News Letter, November 28, 1959

## ASTRONAUTICS

### Space Capsule Mock-Up Passes Water Tests

#### See Front Cover

A MOCK-UP of the project Mercury space capsule is being used to train the astronauts in methods of leaving the space vehicle after the first American returns from orbital flight around the earth to a planned landing in the Atlantic Ocean.

The photograph on the cover of this week's SCIENCE NEWS LETTER shows a McDonnell Aircraft Corporation engineer demonstrating one method of exit from the capsule. The test was conducted at the corporation's St. Louis plant where the capsule is being built for the National Aeronautics and Space Administration.

Four large flotation bags are automatically inflated upon landing and give the capsule stability and buoyancy in the water.

Science News Letter, November 28, 1959

# Questions

CHEMISTRY—What is the significance of the heterocyclic compounds? p. 359.

MEDICINE—Where is trachoma most prevalent? p. 365.

OCEANOGRAPHY—How high is the submerged "island" found in the Arctic Ocean? p. 360.

RADIO ASTRONOMY—What temperature has been reported for Venus? p. 357.

Photographs: Cover, McDonnell Aircraft Corporation; p. 357, Nathan S. Kline; p. 359, U. S. Coast and Geodetic Survey; p. 376, Eastman Chemical Products, Inc.

# How to extend Christmas THE WHOLE YEAR THROUGH

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LIST

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Since late in 1940, packages like these have been going forward to members of the THINGS of science group. Glance over this list, then decide whether a membership, which brings monthly packages on subjects as widely varied as these, isn't just the things for that most unusual person on your Christmas Gift list.

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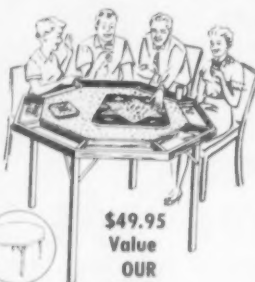
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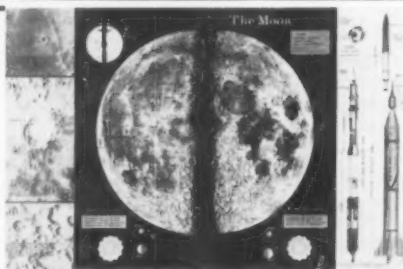
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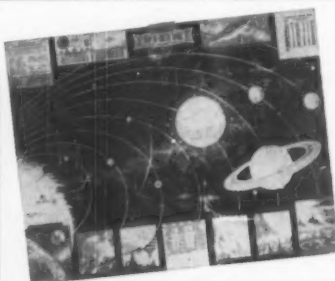


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## Orion Visible

(Continued from p. 369)

of year and slow others, we reckon time from a fictitious body, called the "mean sun," which moves uniformly around the sky. This is the reason that sundial time does not agree with clock time. The sundial may get more than 15 minutes ahead of the clock, or nearly that much behind.

During December the constellation of Perseus is seen to good advantage, for it is directly overhead at a convenient hour. (Its position is shown on the maps.) In Perseus stands the star called Algol, which is a famous variable, i.e., one that regularly changes in brightness.

Normally it is of the second magnitude, or about as bright as the pole star, but every two days and 21 hours it is about a third of that brightness. It takes five hours to dim, and five more to return to normal. In the Celestial Time Table at the end of this article the times when Algol is at minimum brightness during evening hours are listed, so if you look at it on these occasions, you will find its light reduced.

## Two-Starred Algol

Actually, Algol consists of two stars. One is about 27 times as big as the sun and the other is still larger, although it is about a fifteenth as bright. These two stars revolve around a point between them—the center of gravity—once in two days 20 hours and 49 minutes.

On each revolution, as seen from our direction, the faint star passes in front of the bright one and causes a partial eclipse. Algol is the best-known example of a class of stars called "eclipsing variables." In addition there are many other stars that are truly variable. These are single orbs, in which some internal disturbance makes a variation in the output of light.

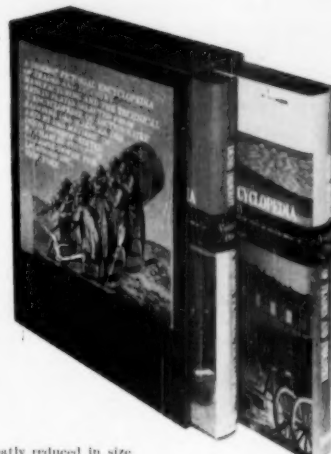
## Celestial Time Table for December

Dec.	EST	
2	1:17 a.m.	Algol at minimum
	1:02 p.m.	Moon passes Saturn
4	10:06 p.m.	Algol at minimum
5	2:00 p.m.	Jupiter behind sun
7	6:55 p.m.	Algol at minimum
	9:11 p.m.	Moon at first quarter
12	2:00 a.m.	Mercury farthest west of sun
13	early a.m.	Geminid meteors visible (seem to radiate from constellation of Gemini)
14	2:00 a.m.	Moon farthest, distance 252,600 miles
	11:49 p.m.	Full moon
22	9:35 a.m.	Winter solstice—sun farthest south and winter begins in Northern Hemisphere
24	11:49 p.m.	Algol at minimum
26	2:00 p.m.	Moon passes Venus
27	8:39 p.m.	Algol at minimum
28	8:00 p.m.	Moon nearest, distance 222,300 miles
29	2:09 p.m.	New moon
30	5:28 p.m.	Algol at minimum

Subtract one hour for CST, two hours for MST, and three for PST.

Science News Letter, November 28, 1959





The illustrations in this ad have been greatly reduced in size.

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## A DIDEROT PICTORIAL ENCYCLOPEDIA

More than 200 years ago there appeared in France a work that eventually built a new world. This was the great French Encyclopedia, or "Encyclopédie des arts & sciences" edited by Denis Diderot. Written by such men as Voltaire, d'Holbach, Grimm, Rousseau, Diderot, indeed, almost every important scientist and author of 18th century Europe contributed—it is generally considered to be one of the dozen most important works ever written. It summed up an era of experience, and it created a new world. Diderot had two purposes in mind: to improve the political atmosphere, and, secondly, to break down the medieval trade-secret system that was stifling science and the arts, and to spread enlightenment. His work eventually fathered the Industrial Revolution.

The Encyclopedia appeared, over some 25 years, in volumes of text, and 13 volumes of giant folio plates. Diderot intended his plates to be the equivalent of a modern technical manual, and stressed clarity and richness of detail. He commissioned the best engravers in Paris, and stopped at nothing to get the best results. (It has been discovered that he even bribed the artists of the French Academy of Sciences and stole plates from them!) As a result, his plates are the very high point of 18th century copper engraving, and are eagerly sought after not only by historians of science but by art collectors and decorators. They are so clear and so life-like, so detailed and so well-planned (in showing technical information) that they equal modern photography.

Professor Charles Gillispie of Princeton University has selected 386 of the best of Diderot's copper-plates, and has written a text for each plate, carefully explaining every operation, every process, every piece of machinery that appears. These plates, most of which are reproduced full-size in this two-volume set, show more than 3,000 men, women and children engaged in the trades, industries, and occupations that made 18th century France synonymous with advancement and enlightenment. They show working scenes in shops and factories, home industries, farm industries; early machinery and power sources, with cutaways, working diagrams, models, studies of processes, and similar material. Professor Gillispie's selection covers just about everything that might have been manufactured in the 18th century, ranging from food production to manufacturers to extractive industries to small handicrafts.

For all the major trades and industries, consecutive series of plates show processes from their very beginnings to the end. In glass, for example, you see just about everything that an 18th century man might have seen had he visited a factory—indeed, you will see more, for much was then secret! You see the furnace being built, the fuel being obtained, the frit mixed, cauldrons built, the melt, its testing, and use. You see every motion involved in making a goblet: dipping the blow-pipe, starting the blow, detaching the globe, putting on the stem, affixing the bottom, annealing the glass, packing it, and delivering it. You will see plate glass poured and rolled; sheet glass blown and cut. You will see the lost art of crown glass: a glob of molten glass was blown and whirled with unbelievable precision until it formed a sheet. This art was so secret that only five families in all France could practice it.

You will see sheep trimmed, their wool processed and washed, dyed with vegetable dyes, spun with

thread (spinning wheels and more advanced equipment), spooled, woven on drawlooms, on Jacquard looms, embroidered, cut into clothing, and fitted. Each operation is so clearly drawn, and the sequences so lucid and complete that it would be impossible to set up a complete 18th century plant for many of the industries described.

### Now even more important culturally than when it first appeared!

In Diderot's day methods were trade secrets, and were not to be learned except by decades of apprenticeship. Today, on the other hand, most processes are not secret, but hand methods have been all but forgotten, and we know even less than did Diderot's contemporaries about the crafts that underlie our civilization—the arts that persisted essentially unchanged from Ancient Egypt to the beginning of the 19th century. Educators have often deplored the fact that we have broken loose from our cultural roots, and that our children are unaware of the continuity of Western Civilization.

We feel that A DIDEROT PICTORIAL ENCYCLOPEDIA is a very important book. It is a reintroduction to our own technological past, to the material that has made more history than all the laws and kings and battles. It will open a window for you into the 18th century, and will show you 18th century Paris in its daily life. It will make you understand the richness of human inventiveness, and it will awaken your sense for tradition. There is no cultured reader in America who cannot afford to examine this set.

### Excellent gift for reader interested in science

A DIDEROT PICTORIAL ENCYCLOPEDIA is not only important for anyone interested in science, history of science, or history of culture; it is also a delightful work for the intelligent high school or college student. Not only is Professor Gillispie one of the country's foremost historians of science; he is also a charming writer who manages to infuse his writing with the wit and warmth of his personality.

Single plates of this work bring from \$5 to \$15 on the rare-print market!

You would find it extremely difficult to look at these prints elsewhere. Sets of the original edition are impossible to find. Few libraries having even partial runs. This is the first collection printed since the 18th century, and this is the only available issue of a major part of this historically great work.

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# New Machines and Gadgets

For sources of more information on new things described, send a self-addressed stamped envelope to SCIENCE NEWS LETTER, 1719 N St., N.W., Washington 6, D. C., and ask for Gadget Bulletin 1015. To receive this Gadget Bulletin without special request each week, remit \$1.50 for one year's subscription.

**RIBBON SPOOL** serves to hold ribbon and to straighten it out should it become twisted during unwinding. The roll of ribbon is placed on a bracket with a guide through which the ribbon is pulled. When the ribbon twists, it may be untwisted by rotating the guide in the opposite direction of the twist.

Science News Letter, November 28, 1959

**TURKEY SKEWERS** for sewing up the breasts of stuffed turkeys, chickens or game fowl are made of stainless steel and tempered to withstand excessive heat. They are in the form of corkscrews, with one end pointed and the other end twisted into a ring to form a handle. They are inserted by turning clockwise and removed by turning counterclockwise.

Science News Letter, November 28, 1959

**MATHEMATICAL PUZZLE CUBE** for the fascination of every member of the family is made up of many smaller hard maple cubes. These may be joined in many ways to form intriguing problem shapes.

Science News Letter, November 28, 1959

**TOY SCHOOL BUS**, shown in the photograph, has a transparent plastic roof to let toddlers enjoy the antics of the animated passengers, including two children who bounce and turn at the rear of the bus and



a driver whose head looks cautiously left and right. The front of the bus is decorated with a cheerful face with eyes that run from side to side as the bus is pulled along.

Science News Letter, November 28, 1959

**RECORD RACK** of hand-rubbed pine is made in the shape of an old-fashioned cranberry scoop. It stands 15 inches high,

14 inches wide and  $8\frac{1}{2}$  inches deep, and holds 50 long-playing record albums. The rack can also be used for magazines.

Science News Letter, November 28, 1959

**BUTTER RULER** of plastic has raised markings to indicate cup, tablespoon and teaspoon portions. By pressing one side of the ruler flat against a chilled quarter-pound bar of butter, the markings become imprinted on the butter's surface. One end of the ruler may be used to slice the butter.

Science News Letter, November 28, 1959

**DOGHOUSE WALL PLAQUE**, nine inches high, is equipped with tablets on which are depicted four repentant looking dogs. Each of these may bear the name of different family members. When one of the family misbehaves, the dog bearing his or her name is hung in the door of the doghouse.

Science News Letter, November 28, 1959

**JEEP-PLANE KIT** comes in an envelope  $11\frac{1}{4}$  by  $16\frac{1}{2}$  inches, and consists of precut parts, such as a fuselage and wings, ready for quick, easy assembly. In use, the assembled plane is twirled around in circles and loops by an attached cord. A propeller produces a roar simulating an actual plane engine.

Science News Letter, November 28, 1959



## Nature Ramblings



By HORACE LOFTIN

SANTA CLAUS will see some 40,000,000 Christmas trees in American homes this year on his annual trip southward from the North Pole. Of these, the handsome balsam fir will greet him more often than any other kind of tree.

Santa (and you) can tell firs from other Christmas trees by their soft, blunt-pointed needles that are slightly curved. Their cones sit upright on the branches like short, fat candles.

The next most popular American Christmas tree is the Douglas fir—not really a fir at all, but a sort of mixture of fir and spruce. It can be identified by a look at its cone. Between each of the scales of the cone is a little three-pronged projection that marks it from any other Christmas tree.

Third in rank is the tiny black spruce, the typical "grocery store" Christmas tree.

What's Your Christmas Tree?



Its diminutive size—usually two to three feet tall—betrays its age, for it may be 25 to 50 years old. These trees are found in immense numbers in the swamps and lowlands of the Great Lakes states, where bad weather and worse soil leads to this dwarfed condition. Spruces of all kinds can be told by their short, sharp-pointed, prickly needles and small cones that hang downward from the branches.

Although fourth place in use, probably the most common American Christmas tree cut wild from the forest is the eastern red cedar.

This tree is very beautiful and is abundant in much of the country. Dad likes to bring it home, but Mother usually objects to its bad habit of dropping its tiny, prickly leaves too easily. Merchants dislike it for this same reason.

The white spruce is fifth in popularity. The cones of this tree are somewhat larger than those of the black spruce and are pale green, tinged with red, rather than the dull gray-brown of the black spruce.

These five evergreens make up about 85% of the American Christmas trees used every year.

The Scotch pine, southern pine, red spruce, Virginia pine, white fir and Norway spruce, in this order, comprise the bulk of the remaining trees that Santa will see.

Science News Letter, November 28, 1959

